

Differential Geometry

Course: MATH 4230

Semester: Winter 2021

Instructor: Yorck Sommerhäuser

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Class meetings: Tuesday, Thursday 12:00 m–12:50 pm,
Friday 1:00 pm–1:50 pm.

We will meet virtually in the online room of the Brightspace site of the course.

Office hours: Tuesday, Thursday 1:00 pm–3:00 pm and by appointment. Office hours will be held virtually at <https://mun.webex.com/meet/sommerh>

Textbook: M. Do Carmo: Differential Geometry of Curves and Surfaces, 2nd ed., Dover Publications, Mineola, 2016 (required resource)

Course description: The course begins with the theory of curves, especially the Frenet-Serret equations for curvature and torsion and the fundamental theorem of the local theory of curves. The course continues with the theory of surfaces, discussing the first and the second fundamental form, Gaussian curvature, Christoffel symbols, the ‘theorema egregium’, the Codazzi-Mainardi equations, the fundamental theorem of the local theory of surfaces, parallel displacement and geodesics, as well as the Gauss-Bonnet theorem.

Coverage: We cover the first two chapters of the textbook almost completely and large parts of the third and the fourth chapter. The fifth chapter will not be covered.

Homework: Beginning Tuesday of the second week, a weekly exercise sheet will be distributed via e-mail. This has to be submitted on the following Tuesday via e-mail. There will be no exercise sheets during the last two weeks of the semester. In addition, a reading assignment from the textbook will be given in every lecture.

Examinations: There will be no examinations.

Final mark: The final mark will be based entirely on the score of the exercise sheets.

Policies: You are expected to participate in every class meeting, from the beginning to the end. Attendance will be recorded, but will not count towards the final mark.

Memorial University accommodates students with disabilities and demands academic integrity. The corresponding university policies can be found at <http://www.mun.ca/policy/site/policy.php?id=239> and in the Academic Calendar in Paragraph 6.12, respectively.

Prerequisite: MATH 3202 (Vector Calculus)